FINAL REPORT
for
MUNICIPAL BEACH IMPROVEMENT PROJECT
at
Aronson Island
Escanaba, Michigan

by the
Michigan Department of Natural Resources - Coastal Management Unit
and the
City of Escanaba

COASTAL MANAGEMENT CONTRACT # 11E-12.2
ROUGH GRADING EXISTING RUBBLE and
PLACEMENT OF BEACH RENOURISHMENT MATERIAL

Prepared by:

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Recreation Director
City of Escanaba, MI

October 16, 1989

I. PROJECT BACKGROUND

The Municipal Beach, located on Aronson Island in Ludington Park, Escanaba, Michigan was destroyed in a combination of both wind and water erosion during the period 1974 through 1986. The City of Escanaba's Municipal Beach was one the focal point of both local citizen and tourist activity as its excellent sandy beach, bathhouse and related support facilities made the Aronson Island Beach a natural recreational focal point on the waters of Little Bay De Noc.

The prospect of reclaiming the Municipal Beach to at least its original form and function has required extensive planning in order to overcome complex problems. From the period 1974 through 1986 the U.S. Army Corps of Engineers conducted three studies which offered alternative recommendations on the reconstruction of the Municipal Beach. Along with the Corps studies, the U.S. Soil Conservation Service was actively involved in recommending methods to protect a reconstructed beachfront from the effects of wind erosion and pedestrian traffic.

Upon extensive review of reconstruction, renourishment and protection options, the City of Escanaba determined that the most feasible method of restoring the Municipal Beach was to embark on the reclamation and renourishment of approximately 1,000 feet of beachfront, provide adequate erosion control for the renourished beachfront and controlled pedestrian access to the beachfront. The renourishment concept, placement of erosion control features, controlling pedestrian access along with providing additional vehicular parking space formed the nucleus of the plan.

The beach renourishment plan was the most feasible and cost effective option put forth by the Corps of Engineers. Breakwall structures or submerged breakwalls in conjunction with beach renourishment was not cost effective nor financially feasible to be undertaken by the City. The cost of placing protective structures at the Municipal Beach along with renourishment of the waterfront ranged from a low of $750,000 to a high of $3.5 million. Again, these options are effective, but not realistic.

By 1986 the City adopted the beach renourishment concept as the only practical and feasible method of reconstructing the Municipal Beach. This plan, too, had its obstacles as the cost of reclaming material suitable for the beachfront carried a high price. Whether the renourishment material was mined at an upland site or dredged from a location near the beachfront site, an estimated minimum of 25,000 cubic yards of fill material would be needed to renourish the beachfront and provide adequate protection features. The cost of mined fill material or dredged material transported to the beachfront was estimated to be a minimum of $250,000. This cost did not reflect the expense of other necessary improvements such as erosion control features, pedestrian access or parking lot repair and expansion. The total estimated cost of complete renourishment and reconstruction of existing facilities at the Municipal Beach was placed at $400,000.

During the period January through July 1988 several unrelated activities would have an impact on the proposed beach renourishment project. In the winter of 1988 the DNR Recreation Division and the Michigan Waterways Commission approved the partial funding of a marina expansion project at Escanaba. In July of 1988 the DNR Recreation Division and the Michigan Natural Resources Trust Fund Board also allocated additional funding of a marina project. The marina project not only called for construction of boat piers, revetment walls and utilities, but also called for the dredging of the marina basin. A minimum of 25,000 cubic yards of dredging spoils would have to be removed from the basin. Upon analyzing core samples of spoils to be dredged, it was determined that the material dredged from the Marina Basin was perfectly suitable for use as beach renourishment material. This plan now provided the City with not only a cost effective option of disposing the dredging spoils, but also provided the Municipal Beach with a renourishment source at no cost to the project.

Corps of Engineers and Michigan Department of Natural Resources construction permits were issued to the City in August 1988. Engineering began in October 1988. Both the Aronson Island Municipal Beach Renourishment Project and the Escanaba Marina Expansion Project were designed, bid and constructed simultaneously.

II. PROJECT FUNDING

The Aronson Island Beach Renourishment Project was financed by the following sources:

Coastal Zone Management - MDNR (Project Agreement #10E-12.2A; Boardwalk and curb cuts)	$ 6,000
Coastal Zone Management - MDNR (Project Agreement #11E-12.2; Rough Grading Existing Rubble and Placement of Beach Nourishment Material)	$15,000
Land and Water Conservation Fund - MDNR (Project Agreement #26-01481; Reimbursement of eligible costs)	$48,123
City of Escanaba - Gas Retirement Fund (LOCAL) (Reimburse all state/federal grants and fund portions of project not reimbursed by other sources)	$80,218
Michigan Outstate Equity Program - MDOC (Project Agreement #89-081; Reimbursement of eligible costs as per project agreement)	$30,000
TOTAL PROJECT FUNDING	$179,341.00

III. TASKS PERFORMED ON THE PROJECT

A. COASTAL MANAGEMENT CONTRACT #10E-12.2A; BOARDWALKS

The plans and specifications called for the installation of 716 l.f. of 4' wide pedestrian boardwalk. The dynamic nature of beachfronts with shifting sands required that the boardwalks, originally designed by the National Park Service, be installed at the project site. 360' of boardwalk was placed parallel between the renourished beachfront and the bathhouse.

Another 356' of boardwalk was installed directly off the north parking lot and the main boardwalk providing access to the beachfront for pedestrians. Handicap accessible curb cuts were provided at the two north parking walkways with an additional curb cut to permit handicap access to the main 360' boardwalk. The project also provided for wheelchair turning radius at each point where beach access boardwalk intersected with the main parallel walkway. The turning radius portion of the boardwalk was constructed in one full piece thus eliminating gaps in the walk were wheelchairs may have difficulty turning.

The boardwalks were delivered to the site in early July of the project period and installed by July 20, 1989.

The boardwalk portion of the project was financed in the following fashion:

Coastal Zone Management Contract #10E-12.2A	$ 6,000
City of Escanaba	$ 6,000
Land and Water Conservation Fund	$ 1,210
City of Escanaba - LWCF Match	$ 1,210
TOTAL BOARDWALK COST	$14,420

B. COASTAL MANAGEMENT CONTRACT #11E-12.2: ROUGH

The project's plans and specifications called for the accomplishment of two tasks under this CZM contract:

1. ROUGH GRADING/REPOSITION EXISTING RUBBLE- During the period from approximately 1976 through the fall of 1988 the City of Escanaba placed concrete rubble on the Municipal Beach waterfront as a rip rap material. The placement of the concrete rip rap served to halt the severe erosion that

had occurred in at the site especially during the high lake level period of 1985-1987.

Prior to the renourishment of the beachfront, as specified for in this project, the concrete rip rap material had to be utilized or disposed of. The rip rap material, which measured 1,100 lineal feet across the face of the beachfront and ten to fifteen feet wide in depth, was buried under the sand dune created in the renourishment process. The project contractor performed the following work on this aspect of the project:

- removed the rip rap, crushed larger pieces and placed windrows on the leeward side of the beach;
- excavated a new three to five foot deep trench; and
- buried the rip rap at depth of approximately 582' to 584' (IGLD)

The rip rap rubble remains at the site and is buried under the newly created sand dune. No less than four foot of covering is over the rip rap material. The contractor also removed all foreign material from the rip rap rubble including all reinforcement rods.

This method was an effective and efficient means of utilizing the rubble material. The material was used as "filler" under the sand dune and significantly reduced the overall cost of the project as it was not necessary to load, transport and dispose the rip rap concrete at another site.

Repositioning of the rip rap material was accomplished during the period May 1, 1989 through May 31, 1989. The repositioning and rough grading of the rubble was financed in the following fashion:

Coastal Zone Management Contract #11E-12.2	= $ 5,000
Michigan Outstate Equity Program	= $ 4,877
City of Escanaba	= $ 4,514
TOTAL RUBBLE REPOSITIONING/ GRADING COSTS	= $14,420

2. PLACEMENT OF BEACH RENOURISHMENT MATERIALS
The second part of CZM contract #11E-12.2 was the placement of renourishment material upon the Municipal Beach. Once the rubble material was in place and graded, renourishment material from the Marina dredging operations were transported from the Marina basin to the Municipal Beach site. The renourishment material was both hydraulically transported via 12" piping and by truck.

Once on the beachfront, the dredging spoils/renourishment materials were compacted and fine graded into position. Approximately 35,000 cubic yards of renourishment material was placed and positioned upon the beachfront. As stated previously, a dune was also created at a height of approximately 590' (IGLD).

Placement of the beach renourishment material was accomplished by the contractor during the period May 20, 1989 through July 30, 1989. The placement of the renourishment materials was financed in the following fashion:

Coastal Zone Management Contract #11E-12.2	$10,000
Michigan Outstate Equity Program	$10,000
Land and Water Conservation Fund	$ 6,587
City of Escanaba	$ 6,587
TOTAL COST OF PLACEMENT OF RENOURISHMENT MATERIALS	$33,174

C. OTHER PROJECT COMPONENTS AND TASKS NOT FUNDED BY CZM

Other components and tasks accomplished on the Municipal Beach Renourishment Project included:

- Installation of 1,100 LF of rustic wood fencing to control pedestrian access to the beach;
- Reconstruction of Parking Lot "A" on the north side of the beach which included the installation of a storm sewer, new curbing, new base and asphalt surface;
- Creation of Parking Lot "B" on the south side of the beach which included excavation, installation of storm sewer, gravel base and asphalt surface;
- Planting of 70,000 sq. ft. of beach grass for erosion control purposes; and
- Top, seed, fertilizer and mulching of distributed areas around parking lots, beachhouse and the leeward side of the beachfront.

All of the aforementioned tasks were declared substantially complete by the project engineer on August 3, 1989. The Escanaba Municipal Beach was reopened to the general public on August 7, 1989 after a five year closure due to high lake levels and severe erosion.

The Escanaba Municipal Beach Project's prime contractor was Roy Ness Contracting, Escanaba, MI along with his other subcontractor, namely, Gallagher Marine, Inc. and Jaeger Bros. Construction Company of Escanaba, Northern Landscaping of Vulcan, MI and VanDerbeck Fencing also of Escanaba.

IV. PROJECT FINANCIAL REPORT

Section II of this report itemizes the source and the amount of funds that were available on this project. Attachment #1 itemizes the expenditures of the project and accounts for all sources. It should be noted that all Coastal Zone Management funds have been expended in the fashion dictated by each

contract, Contract #10E-12.2A and Contract #11E-12.2. Further, the CZM matching requirements have also been successfully met as illustrated:

Contract #10E-12.2A Boardwalk		
CZM @	$6,000	(federal)
City of Escanaba @	$6,000	(local)
Land and Water Fund	$1,210	(federal)
City of Escanaba	$1,210	(local)
TOTAL BOARDWALK	$14,420	

Contract #11E-12.2 Beachfill		
CZM @	$10,000	(federal)
Outstate Equity @	$10,000	(state)
Land and Water Fund	$ 6,587	(federal)
City of Escanaba	$ 6,587	(local)
TOTAL BEACHFILL REPLACEMENT	$33,174	

Rubble Repositioning		
CZM @	$5,000	(federal)
Outstate Equity @	$4,877	(state)
City of Escanaba @	$4,514	(local)
TOTAL RUBBLE REPOSITIONING	$14,391	

Again, the above illustrates and the Attachment #1 demonstrates full and complete execution of matching requirements of the Coastal Management contracts referred to in this text. All CZM monies are matched with either Outstate Equity Funds (state) or with City of Escanaba funds (local).

V. OTHER REQUIRED ATTACHMENT AND SUBMITTALS

Please also find enclosed with this project report are:

1. One set of ten 3 1/2" x 5" color photos;
2. One set of ten 35 mm color slides;
3. Three sets of xerox copies of the photos;
4. Two original 8" x 10" aerial photos depicting the Municipal Beach before and after the project;
5. Two sets of xerox copies of the 8" x 10" photos; and
6. Three copies of a reduced version of the project plans.

The City of Escanaba will also be submitting a video tape illustrating the various phases of the project. The video tape has yet to be edited and will be submitted to the Coastal Management Unit of the DNR upon completion.

VI. PROJECT ENGINEERING/COORDINATOR

The engineering for this project was completed by:

Sundberg, Carlson & Associates
914 West Baraga Avenue
P.O. Box 100
Marquette, MI 49855
John Batchelder, P.E., Project Manager
(906) 228-2333

The Municipal Beach Project was coordinated on behalf of the City of Escanaba by:

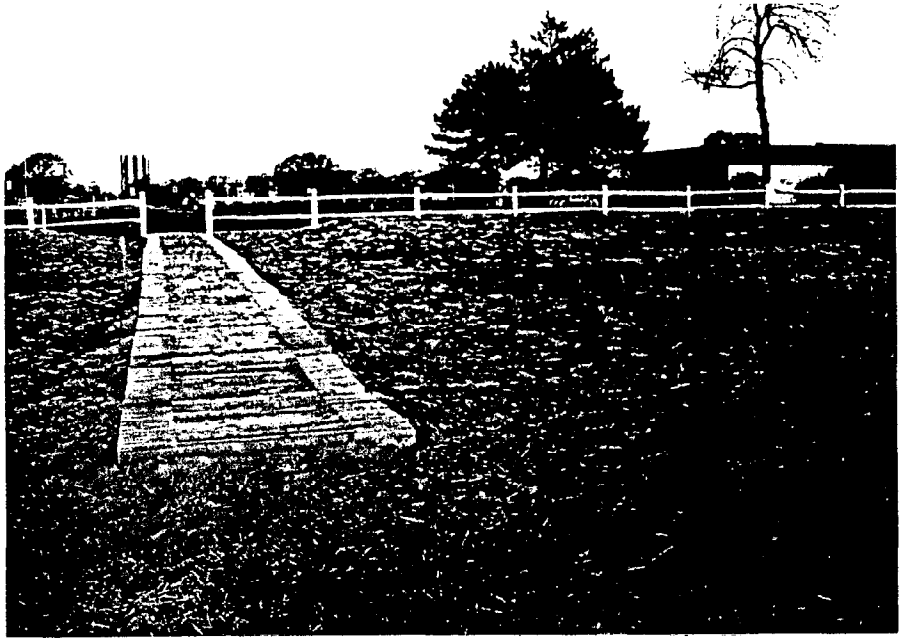
Anthony J. Schomin, Jr.
Recreation Director
121 South 11th Street
Escanaba, MI 49829
(906) 786-4141

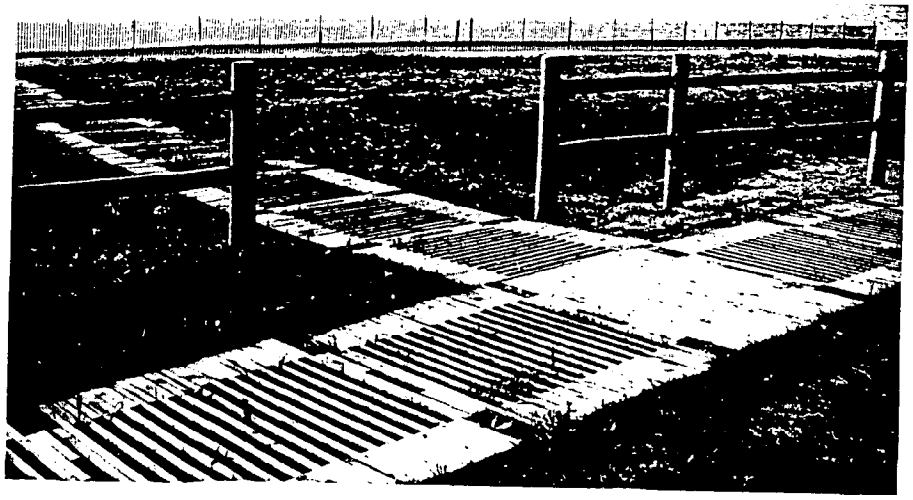
City of Escanaba

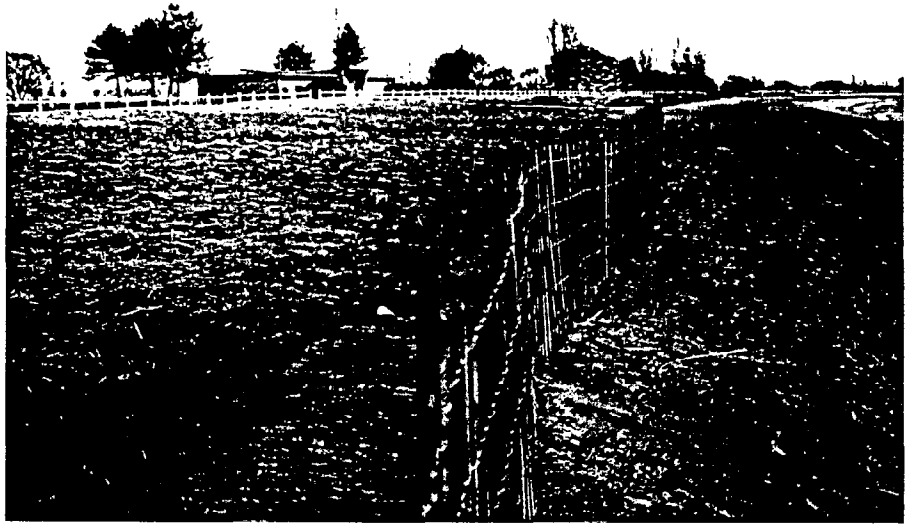
Municipal Beach Project

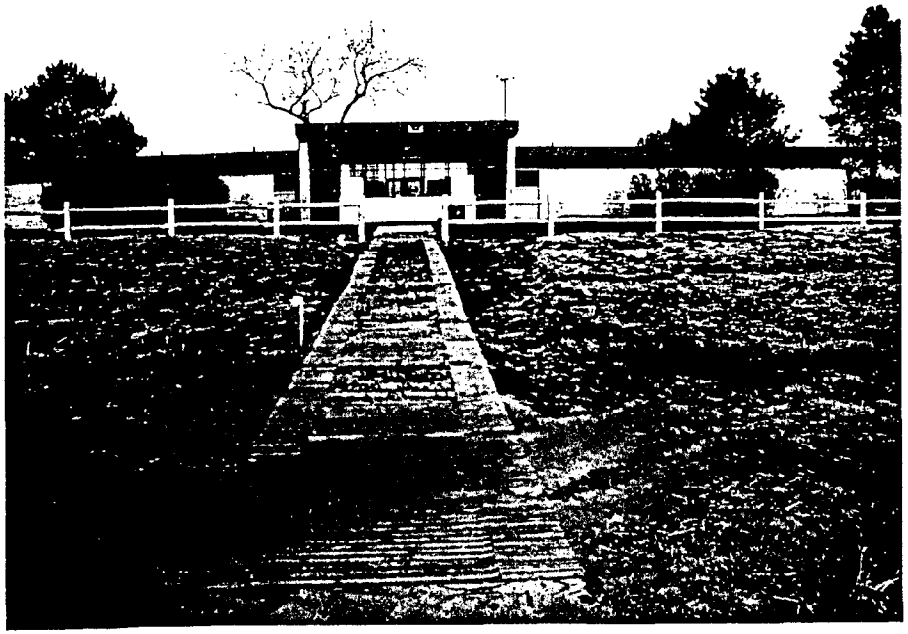
(ACTUAL OCTOBER 12, 1989)

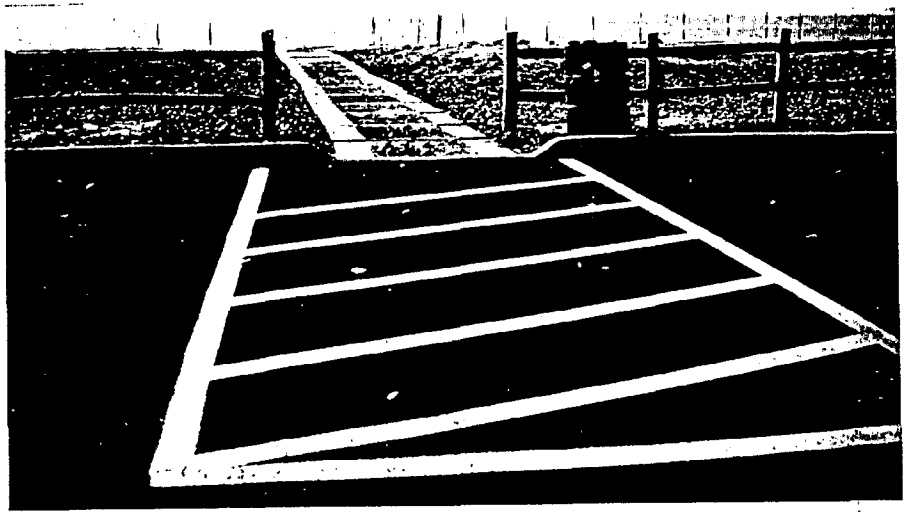
Component/Item	Actual Cost	Coastal Management Reimburse.	Land & Water Reimburse.	Outstate Equity Reimburse.	Local Share Reimburse.	TOTAL-ALL SOURCES
Reposition Rubble	$14,391.00	$5,000.00	$0.00	$4,877.00	$4,514.00	$14,391.00
Placement of Beach Fill	33,174.00	10,000.00	6,587.00	10,000.00	6,587.00	33,174.00
Install Wood Fence	5,940.00	0.00	2,970.00	2,762.00	208.00	5,940.00
Boardwalk Placement	14,420.00	6,000.00	1,210.00	0.00	7,210.00	14,420.00
Install Beachgrass	13,220.00	0.00	6,610.00	1,875.00	4,735.00	13,220.00
Parking Lot A						
Excavation, Fill	7,354.00	0.00	3,677.00	0.00	3,677.00	7,354.00
Storm Sewer	4,459.00	0.00	257.00	0.00	4,202.00	4,459.00
Storm Drain	935.00	0.00	0.00	0.00	935.00	935.00
Rip Rap	125.00	0.00	0.00	0.00	125.00	125.00
Concrete Curb	5,456.00	0.00	2,728.00	0.00	2,728.00	5,456.00
Aggregate/Gravel	3,237.50	0.00	1,618.75	0.00	1,618.75	3,237.50
Bituminous Base	2,968.00	0.00	1,484.00	0.00	1,484.00	2,968.00
Bituminous Surface	2,968.00	0.00	1,484.00	0.00	1,484.00	2,968.00
Parking Lot B						
Excavation, Fill	8,350.00	0.00	0.00	0.00	8,350.00	8,350.00
Storm Sewer	1,980.00	0.00	0.00	0.00	1,980.00	1,980.00
Storm Drain	935.00	0.00	0.00	0.00	935.00	935.00
Rip Rap	125.00	0.00	0.00	0.00	125.00	125.00
Aggregate/Gravel	6,125.00	0.00	1,313.00	0.00	4,812.00	6,125.00
Bituminous Base	6,529.60	0.00	3,264.80	0.00	3,264.80	6,529.60
Bituminous Surface	7,630.00	0.00	3,815.00	0.00	3,815.00	7,630.00
Topsoil,Seed	1,782.00	0.00	891.00	0.00	891.00	1,782.00
Bonding	4,600.00	0.00	0.00	0.00	4,600.00	4,600.00
Total General Contractor	$146,704.10	$21,000.00	$37,909.55	$19,514.00	$68,280.55	$146,704.10
Bridge Dredging	11,400.00	0.00	0.00	0.00	11,400.00	11,400.00
Signs	325.00	0.00	0.00	0.00	325.00	325.00
Printing/Publishing	212.40	0.00	0.00	0.00	212.40	212.40
Sub-Total	$158,641.50	$21,000.00	$37,909.55	$19,514.00	$80,217.95	$158,641.50
Engineering	20,699.74	0.00	10,213.74	10,486.00	0.00	20,699.74
PROJECT TOTALS	$179,341.24	$21,000.00	$48,123.29	$30,000.00	$80,217.95	$179,341.24

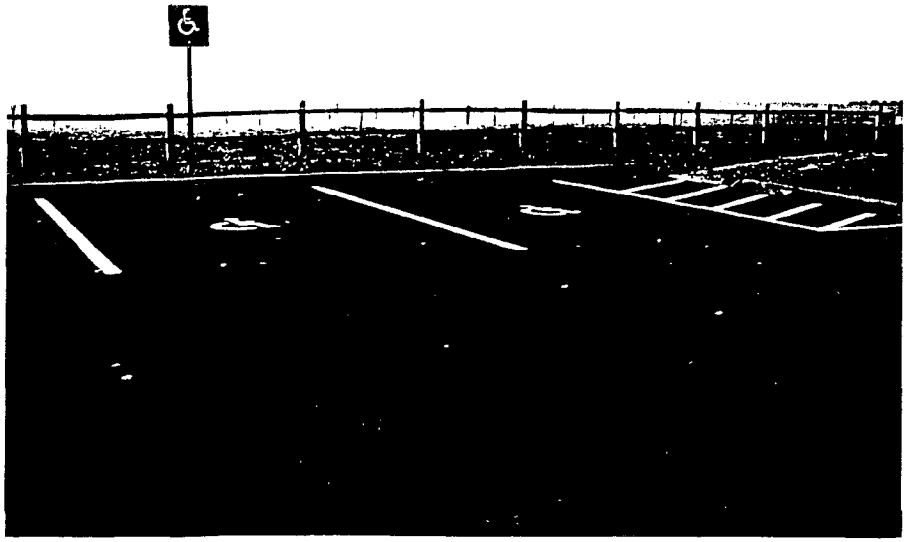


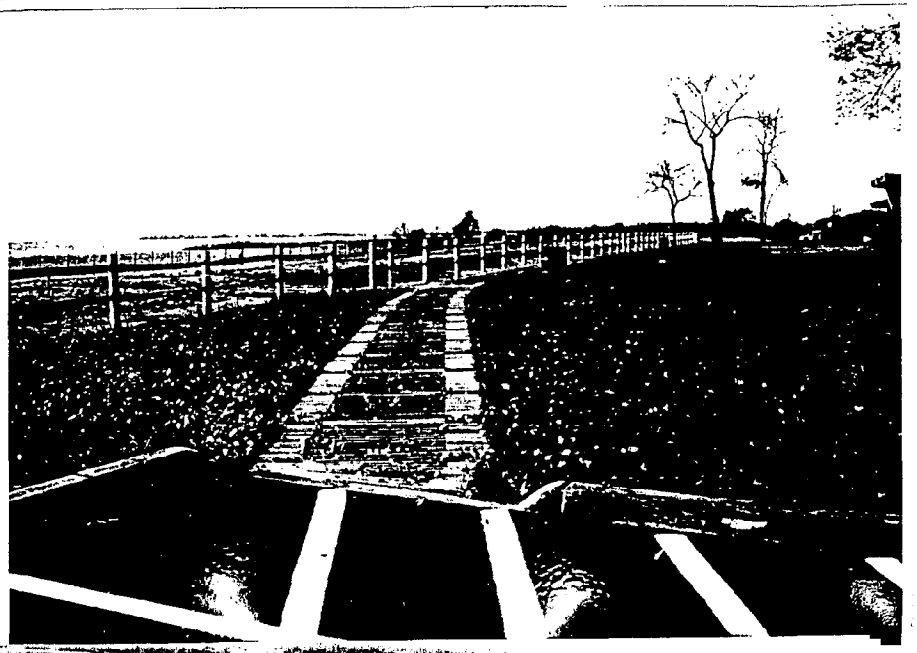


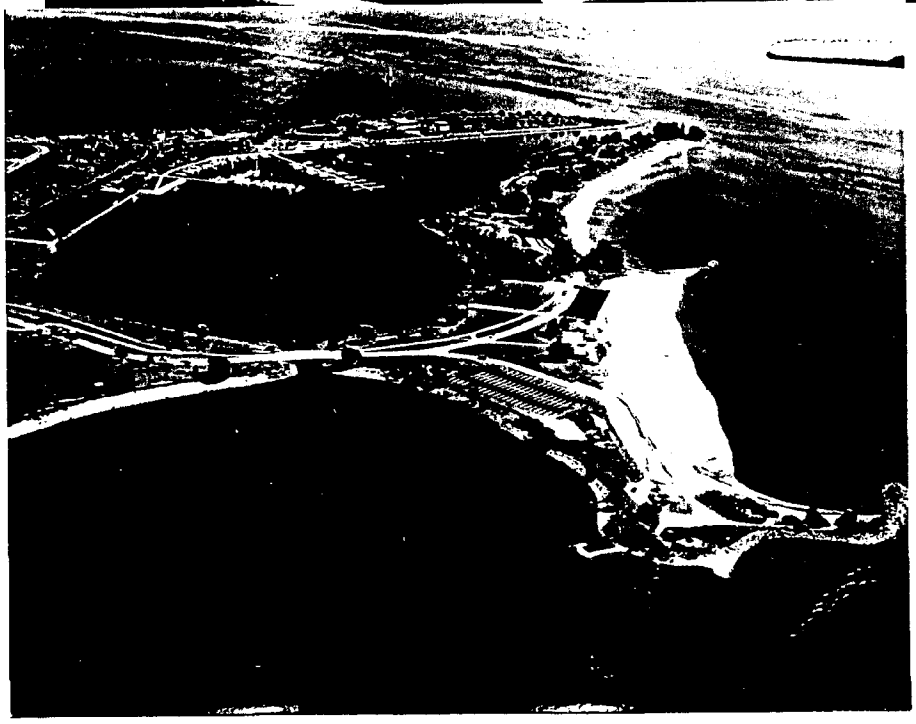






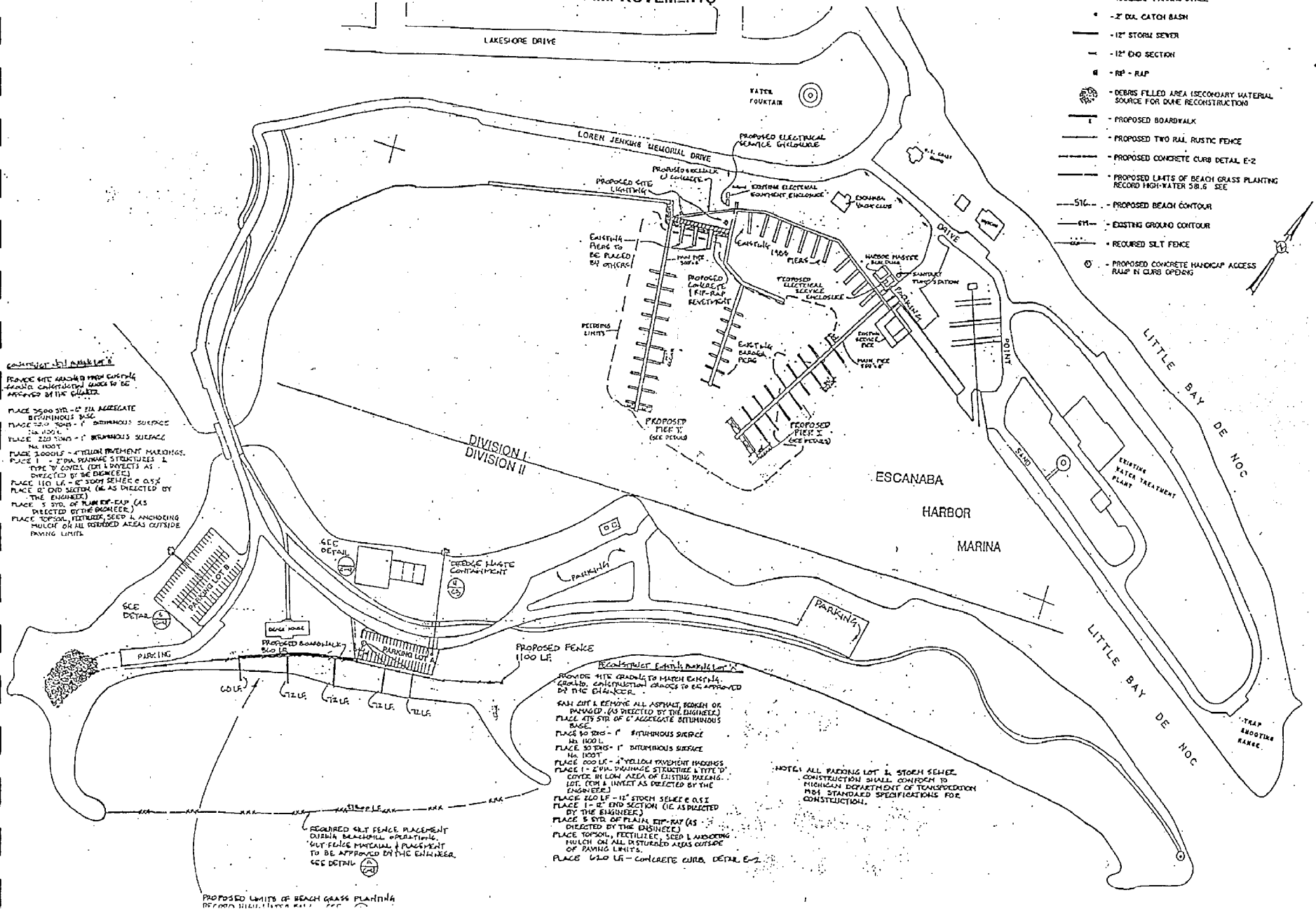






CITY OF ESCANABA

MARINA & BEACH IMPROVEMENTS



LEGEND

- HANDICAP PARKING STALL
- 2' DIA. CATCH BASIN
- 12" STORM SEWER
- 12" END SECTION
- RIP - RAP
- DEBRIS FILLED AREA (SECONDARY MATERIAL SOURCE FOR DUNE RECONSTRUCTION)
- PROPOSED BOARDWALK
- PROPOSED TWO RAIL RUSTIC FENCE
- PROPOSED CONCRETE CURB DETAIL E-2
- PROPOSED LIMITS OF BEACH GRASS PLANTING RECORD HIGH-WATER 581.6 SEE
- 576 - PROPOSED BEACH CONTOUR
- 576 - EXISTING GROUND CONTOUR
- REQUIRED SILT FENCE
- PROPOSED CONCRETE HANDICAP ACCESS RAMP IN CURB OPENING

CONSTRUCT (E) PARKING LOT 'B'

PROVIDE SITE GRADING TO MATCH EXISTING GRADES. CONSTRUCTION GRADES TO BE APPROVED BY THE ENGINEER.

PLACE 3500 SYD. - 6" CR 6A AGGREGATE BITUMINOUS BASE

PLACE 2200 TONS - 1" BITUMINOUS SURFACE (2A 1100T)

PLACE 220 TONS - 1" BITUMINOUS SURFACE No. 1100T

PLACE 2,000 LF - 4" YELLOW PAVEMENT MARKINGS.

PLACE 1 - 2' DIA. DRAINAGE STRUCTURES & TYPE 'D' COVERS (OR 1 INVERTS AS DIRECTED BY THE ENGINEER)

PLACE 110 LF - 12" STORM SEWER @ 0.5%

PLACE 2 - 12" END SECTION (OR AS DIRECTED BY THE ENGINEER)

PLACE 5 SYD. OF PLAIN RIP-RAP (AS DIRECTED BY THE ENGINEER.)

PLACE TOPSOIL, FERTILIZER, SEED & ANCHORING MULCH ON ALL DISTURBED AREAS OUTSIDE PAVING LIMITS.

RECONSTRUCT EXISTING PARKING LOT 'A'

PROVIDE SITE GRADING TO MATCH EXISTING GRADES. CONSTRUCTION GRADES TO BE APPROVED BY THE ENGINEER.

SAW CUT & REMOVE ALL ASPHALT, BROKEN OR DAMAGED (AS DIRECTED BY THE ENGINEER.)

PLACE 475 SYD OF 6" AGGREGATE BITUMINOUS BASE.

PLACE 90 TONS - 1" BITUMINOUS SURFACE No. 1100 L.

PLACE 50 TONS - 1" BITUMINOUS SURFACE No. 1100T

PLACE 200 LF - 4" YELLOW PAVEMENT MARKINGS

PLACE 1 - 2' DIA. DRAINAGE STRUCTURE & TYPE 'D' COVER IN LOW AREA OF EXISTING PARKING LOT. (OR 1 INVERT AS DIRECTED BY THE ENGINEER.)

PLACE 260 LF - 12" STORM SEWER @ 0.5%

PLACE 1 - 12" END SECTION (OR AS DIRECTED BY THE ENGINEER.)

PLACE 5 SYD. OF PLAIN RIP-RAP (AS DIRECTED BY THE ENGINEER.)

PLACE TOPSOIL, FERTILIZER, SEED & ANCHORING MULCH ON ALL DISTURBED AREAS OUTSIDE OF PAVING LIMITS.

PLACE 620 LF - CONCRETE CURB, DETAIL E-2

NOTE: ALL PARKING LOT & STORM SEWER CONSTRUCTION SHALL CONFORM TO MICHIGAN DEPARTMENT OF TRANSPORTATION 1984 STANDARD SPECIFICATIONS FOR CONSTRUCTION.